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["Challenges of a Changing Earth" Conference in Amsterdam](#)

## UNH Scientists Take Part in International Conference on Global Change

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July 16, 2001

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DURHAM, N.H. -- Planet Earth has entered into an era without precedent. While scientists often point to human-driven changes that are modifying the global environment, it is now apparent that these changes are cumulative and interacting with natural systems, and could accelerate the Earth into a different state with implications for its habitability.

This striking message came from hundreds of global change scientists from around the world -- including several from the University of New Hampshire -- who met last week in Amsterdam for one of the largest international conferences ever held on global change.

Coming just two days before the continuation of the Kyoto Protocol Talks in Bonn July 16, the conference, titled "Challenges of a Changing Earth," presented the latest scientific understanding of planet Earth and how it is changing through natural and human forces. It also explored what the future may hold.

"Humans are altering the ecology, chemistry and climate of the planet," said Berrien Moore, director of UNH's Institute for the Study of Earth, Oceans, and Space, and chair of the scientific committee of the International Geosphere-Biosphere Programme (one of the conference organizers). "The Earth system has moved well outside the range of natural variability exhibited over the last half million years at least. The changes are occurring simultaneously in the global environment, their magnitudes and rates are unprecedented in human history, and probably the history of the planet."

Moore, who gave the opening address at the conference, pointed out several changes taking place that are having dramatic impact on the global environment and human societies. "These changes are, in fact, changes in the human-nature relationship," he said. "They are recent; they are profound; and many are accelerating."

- During the past three centuries human population has increased 10 fold; in the twentieth century alone population has increased by four billion. Urbanization has increased tenfold and nearly all since 1900.
- In a few generations humankind is exhausting fossil fuel reserves that were generated over several hundred million years.
- Nearly 50% of the land surface has been transformed by direct human action, with significant consequences for biodiversity, nutrient cycling, soil structure and biology, and climate.
- More nitrogen is now fixed synthetically and applied as fertilizers in agriculture than is fixed naturally in all terrestrial ecosystems.
- More than half of all accessible freshwater is used directly or indirectly by humankind, and underground water resources are being depleted rapidly in many areas.
- The concentrations of several climatically important greenhouse gases, in addition to CO<sub>2</sub> and CH<sub>4</sub>, have substantially increased in the atmosphere. There is now a discernible human influence on global climate.
- Coastal and marine habitats are being dramatically altered; 50% of mangroves have been removed and wetlands have shrunk by one-half.
- About 22% of recognized marine fisheries are overexploited or already depleted, and 44% more are at their limit of exploitation.
- Extinction rates are increasing sharply in marine

and terrestrial ecosystems around the world; the Earth is now in the midst of its first great extinction event caused by the activities of a single biological species.

Scientists covered many topics of global change at the conference, including food production losses, water scarcity, global warming, the Kyoto protocol, and the role of technology in a sustainable future.

In addition to Moore, UNH scientists and graduate students whose work was presented include Charles Vorosmarty, Mary Martin, Scott Ollinger, John Aber, Balazs Fekete, Lawrence Dingman, Bob Braswell, Kathy Hibbard, Changsheng Li, Stephen Frolking, William Salas, Xiangming Xiao, Mimi Becker, George Hurtt, Patrick Crill, Wil Wolheim, Peter Czepiel, Jennifer Boles, Theodore Loder, III, Janet Campbell, David Meeker, Mark Dowell, Timothy Moore, Dork Sahagian, Richard Lammers, Stanley Glidden, Michael Routhier, Annette Schloss, Michael Rawlins, Jack Dibb, Stephen Boles, Michael Keller, Alexander Shiklomanov, David Bjerklie, David Howland, Manoel Cardoso, Amy Frapper, Stephen Hagen, Pamela Green, Joseph Salisbury, Michael Prentice, Cassiano D'Almeida, Erin Penfold, and Brian Pellerin.

"The challenges of confronting and coping with global environmental changes and addressing and securing a sustainable future are daunting and immediate for all cultures, but they are not insurmountable," said Moore. "The challenges can be met, but only with a new and even more vigorous approach to understanding our changing planet and ourselves. There must be commitment by all to alter our actions. We simply must take some of the pressure off the Earth."

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